

## CLAIMS

1. A fuel cell system comprising:

a fuel cell body having an anode electrode supplied with fuel gas containing  
5 hydrogen and a cathode electrode supplied with oxidizer gas;

a catalyst degradation-suppressing device operative to interrupt supplying  
oxidizer gas to the cathode electrode after disconnecting an external load from the  
fuel cell body and allow a load current, generated by the fuel cell body, to be  
extracted by an internal load while supplying the fuel gas to the anode electrode;

10 a hydrogen supply stop device operative to interrupt a supply of the fuel gas to  
the anode electrode except for residual hydrogen being supplied thereto during a  
period in which the load current is extracted by the internal load; and

a load current control device controlling a target load current such that after the  
supply of fuel gas to the anode electrode is stopped, a pressure inside the anode  
15 electrode is maintained at a target pressure.

2. The fuel cell system according to claim 1, wherein catalyst  
degradation-suppressing device stops extracting the load current by the internal  
load when the target load current drops below a given value.

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3. The fuel cell system according to claim 1, wherein the load current control  
device lowers the target pressure such that the lower the pressure inside the anode  
electrode, the slower will be the drop speed in the target pressure.

25 4. The fuel cell system according to claim 1, further comprising:

a hydrogen circulation path through which exhaust hydrogen, expelled from an  
outlet of the anode electrode, is circulated to an inlet of the anode electrode; and

a hydrogen circulation device by which fuel gas is circulated; and

wherein the hydrogen circulation device is actuated prior to extracting the load  
30 current by the internal load.

5     5. The fuel cell system according to claim 1, further comprising:  
a purge valve connected to an outlet of the anode electrode; and  
wherein the purge valve is opened prior to interrupting the supply of fuel gas to  
the anode electrode.

6. The fuel cell system according to claim 1, further comprising:  
a hydrogen pressure regulator valve connected to an inlet of the anode electrode  
for regulating the pressure at the inlet of the anode electrode to a given pressure  
10     during the period in which the load current is extracted by the internal load.

7. The fuel cell system according to claim 6, further comprising:  
a pressure sensor sensing the pressure at the inlet of the anode electrode to  
provide a measured pressure; and  
15     hydrogen pressure control means responsive to the measured pressure delivered  
from the pressure sensor for controlling the hydrogen pressure regulator valve to  
allow fuel gas to be compensated by a rate consumed by the fuel cell body during  
the period in which the load current is extracted by the internal load.

20     8. The fuel cell system according to claim 1, wherein when the pressure in the  
anode electrode is maintained at the target pressure, the amount of residual  
hydrogen flowing into the anode electrode from a downstream of the hydrogen  
supply stop device nearly equals the amount of hydrogen consumed by the load  
current.

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9. The fuel cell system according to claim 1, further comprising:  
a pressure sensor sensing a pressure at an inlet of the anode electrode to provide  
a measured pressure; and  
wherein the catalyst degradation-suppressing device provides the target load  
30     current based on the target pressure and the measured pressure delivered from the

pressure sensor.

10. The fuel cell system according to claim 9, wherein the catalyst degradation-suppressing device determines a first target pressure drop response  
5 pattern and a second target pressure drop response pattern that is slower in rate of response than that of the first target pressure drop response pattern whereby when the pressure in the anode electrode is below a given value, the second target pressure drop response pattern is selected to allow the load current control device to vary the target load current in accordance with the second target pressure drop  
10 response pattern.

11. The fuel cell system according to claim 1, further comprising:  
dilution means connected to an outlet of the anode electrode to dilute hydrogen to be exhausted to a given concentration; and  
15 wherein the catalyst degradation-suppressing device is operative to set a target pressure lower limit value based on a dilution capacity of the dilution means.

12. The fuel cell system according to claim 1, further comprising:  
a voltage sensor detecting a given voltage of the fuel cell body to provide a  
20 detected voltage; and  
wherein the catalyst degradation-suppressing device is operative to cause the hydrogen supply stop device to interrupt the supply of fuel gas to the anode electrode in response to the detected voltage.

25 13. A fuel cell system comprising:  
a fuel cell body having an anode electrode supplied with fuel gas containing hydrogen and a cathode electrode supplied with oxidizer gas;  
catalyst degradation-suppressing means for interrupting a supply of oxidizer gas to the cathode electrode after disconnecting an external load from the fuel cell  
30 body and allow a load current, generated by the fuel cell body, to be extracted by

an internal load while supplying the fuel gas to the anode electrode;

hydrogen supply stop means for interrupting a supply of fuel gas to the anode electrode except for residual hydrogen being supplied thereto during a period in which the load current is extracted by the internal load; and

- 5      load current control means for controlling a target load current such that after the supply of fuel gas to the anode electrode is stopped, a pressure inside the anode electrode is maintained at a target pressure.

14. A method of operating a fuel cell system, comprising:

- 10      providing a fuel cell body having an anode electrode supplied with fuel gas containing hydrogen and a cathode electrode supplied with oxidizer gas;

providing an internal load;

interrupting a supply of oxidizer gas to the cathode electrode after disconnecting an external load from the fuel cell body;

- 15      connecting the internal load to the fuel cell body to allow a load current to be extracted from the fuel cell body while supplying the fuel gas to the anode electrode;

interrupting a supply of the fuel gas to the anode electrode except for residual hydrogen being supplied thereto during a period in which the load current is

- 20      extracted by the internal load; and

controlling a target load current such that after the supply of fuel gas to the anode electrode is interrupted, a pressure inside the anode electrode is maintained at a target pressure.